NATIONAL CENTER FOR GEOSPATIAL INTELLIGENCE STANDARDS

STANDARDS

The Foundation for Interoperability

STRATEGIC OVERVIEW for the NCGIS

July 2004

NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY

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FOREWORD

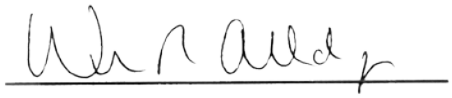
The National Geospatial-Intelligence Agency (NGA) formed the National Center for Geospatial Intelligence Standards (NCGIS) in order to help execute the Director of NGA's vital role as Functional Manager for geospatial intelligence activities within the Department of Defense (DoD) and non-DoD components of the Intelligence Community (IC), including, where appropriate, NGA's mission production partners. The major goal of the Center is to promote common standards for interoperability within this community to support the National System for Geospatial-Intelligence (NSG).

As both a National Intelligence and Combat Support Agency, NGA is striving to transform its operations to meet the needs of its 21st Century customers for timely, relevant, and accurate geospatial intelligence. A future enterprise-wide architecture will provide the framework for the NSG to operate in an interoperable net-centric, data-centric, and multi-intelligence (multi-INT) environment to meet these challenges. Common non-Government geospatial intelligence standards will provide the foundation for this interoperability.

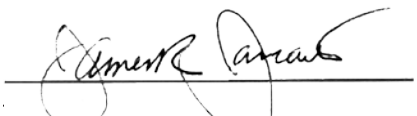
The Standards Roadmap for the NCGIS describes the goals and operations of the NCGIS as it facilitates improvements in interoperability through standards and standards-based analysis. It identifies the key objectives the NCGIS will strive to achieve and a program management strategy and standards direction that it will follow. Through implementation of the Standards Roadmap, the NCGIS carries out the Director of NGA's responsibilities as Functional Manager for geospatial intelligence standards, in addition to supporting the concepts of Joint Vision 2020 and advancing the strategic goals of the Defense Standardization Program (DSP).

NGA has a proud history of leadership in the development and implementation of standards that support technological advances in the use of imagery, imagery intelligence, and geospatial information. NGA's strong leadership in standards will continue through the activities of the NCGIS. The NCGIS will work with its customers and stakeholders to provide the standards and services they need to enhance geospatial intelligence communications and information dissemination.

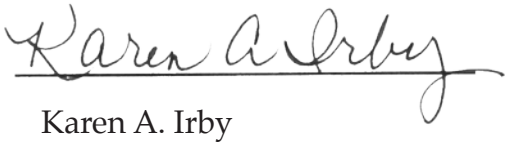
James R. Clapper, Jr.
Lieutenant General, USAF (Ret.)
Director, NGA



William R. Allder, Jr.
Director, Office of Strategic Transformation



James R. Jancaitis
Director, Geospatial Intelligence
Standards Division



Karen A. Irby
Director, National Center for
Geospatial Intelligence Standards

1. INTRODUCTION

The National Center for Geospatial Intelligence Standards (NCGIS) was established by the Director of the National Geospatial-Intelligence Agency (NGA), Lieutenant General James R. Clapper, Jr. (USAF Ret.), on 18 September 2002 with the following mandate, as stated in the NIMA [now known as NGA] Public Affairs Press Release [1]:

> *"…D/NIMA is establishing a National Center for Geospatial Intelligence Standards [NCGIS]… [that] will address standards issues relevant to enabling technologies, data architecture and software tools as NGA moves toward implementing a comprehensive, enterprise-wide standards management policy for the NSGI [National System for Geospatial-Intelligence]."*

As the lead office supporting the Director of NGA's Functional Manager responsibilities for geospatial intelligence standards for the National System for Geospatial-Intelligence (NSG), the NCGIS advocates for the needs of NGA and the NSG community, i.e., the Department of Defense (DoD) and the Intelligence Community (IC), including, where appropriate, NGA's civil and coalition partners. The NCGIS ensures that NGA's standards management program is fully funded and staffed to execute its mission, and is empowered to exercise its authority through delegation of its funding and resources as appropriate.

The National System for Geospatial-Intelligence (NSG) is the integration of technology, policies, capabilities, and doctrine necessary to conduct geospatial intelligence in a multi-intelligence (multi-INT) environment.

Geospatial Intelligence is defined as the exploitation and analysis of imagery and geospatial information to describe, assess, and visually depict physical features and geographically referenced activities on the Earth in support of national security needs.

The scope of the NCGIS standards activities extends to those standards issues that affect geospatial intelligence and their enabling technologies. The role of the NCGIS is limited to the technologies, and their associated procedures, by which NGA and the NSG community encode, represent, store, discover, and distribute geospatial intelligence data and information that is shared within an interoperable environment with other NSG components. Examples of geospatial intelligence standards addressed by the NCGIS include geospatial intelligence metadata, imagery content and format, geographic feature encoding and portrayal, geospatial intelligence reporting, and information transfer.

The NCGIS supports standards and standardization efforts that enable timely, relevant, and accurate geospatial intelligence in a networked environment. As outlined in Joint Vision 2020 [2], the capability to operate jointly in coalition operations is critical to the success of national missions. Inaccurate or time-consuming exchanges of data and information can have life or death consequences. Data accessibility, quality, and integrity (having the information you need, when you need it) are key capabilities required to achieve an optimal data-sharing environment. The need for common data standards that improve interoperability, an essential element of situational awareness, is also a recognized goal of the Defense Standardization Program (DSP) [3]. Geospatial intelligence interoperability can be defined as the ability of systems, units, and forces to discover, retrieve, exploit, and exchange geospatial intelligence data and information with other systems, units, and forces, through a system of networks and services, thus enabling the DoD, IC, and coalition partners to operate effectively together.

The goals and objectives of the NCGIS align with the strategic direction of NGA as articulated in National System for Geospatial-Intelligence (NSG) Strategic Intent [4]. They support the concepts of Joint Vision 2020 and advance the strategic goals of the DSP. In addition, they work toward realizing the standards policy objectives of the Office of Management and Budget (OMB) [5]: to enhance coordination of geospatial data activities and reduce the reliance on government-unique standards. To this end, the NCGIS promotes optimal interoperability through use of a hierarchy of international, national, and federal standards, precluding the need to develop and use DoD-unique standards and product specifications, except in those cases where other standards do not meet NSG requirements.

2. PURPOSE AND SCOPE OF THE STRATEGIC OVERVIEW

The Strategic Overview is the guiding document for the NCGIS as it builds a "Roadmap" to the future. It identifies the goals and objectives that will guide the implementation and program plans of the NCGIS as the NGA and NSG community move toward the realization of an integrated, interoperable enterprise-wide system that provides the best geospatial intelligence information available to the war-fighters and decision makers.

To carry out these goals and objectives, the NCGIS will:

a. Actively lead the NSG community on all matters relating to geospatial intelligence standards,
b. Define a viable environment for and promote best practices in standards management,
c. Address issues on standards management policies and technical standards that impact the geospatial intelligence infrastructure,
d. Pursue geospatial intelligence standards that enhance our ability to manage and share geospatial intelligence,
e. Continually assess the viability of commercial standards, measuring their return on investment at the enterprise level,
f. Represent the NSG community on geospatial intelligence standards in appropriate standards forums, and
g. Leverage acquisition investments and research and development initiatives to encourage industry to adopt standards that advance interoperability and support data-centric architectures and net-centric environments.

3. MISSION

The NCGIS executes the Director of NGA's responsibilities as Functional Manager of geospatial intelligence standards. It does this by setting, implementing, and being an advocate for geospatial intelligence standards and standards management processes and policies that promote interoperability and operational efficiency across the NSG community.

4. GUIDING CONCEPT

Standards: The Foundation for Interoperability…

The NCGIS is a committed and focused enterprise-wide center that leads the NSG community in ensuring, through the identification and adoption of common standards, the availability, accessibility, and usability of geospatial intelligence data. The NCGIS is recognized for advancing the achievement of system interoperability and the strategic intent of the NSG and the Defense Standardization Program.

NCGIS Core Values

The NCGIS is committed to…

Customers…We are committed to providing effective and timely geospatial intelligence standards and standardization information and services that meet the needs of our DoD, Intelligence, and civil and international community customers.

Production Partners…We are committed to partnering with our production partners in the development of standards to support future joint operations involving geospatial intelligence and geospatial intelligence production.

Realization of The Common Operational Picture…We recognize that those we serve require reliable information with a common geospatial foundation. To that end, we will champion standards that enable access to effective, timely, and affordable geospatial intelligence data and information

The NSG…We support the Director of NGA's role in leading the NSG as Functional Manager for geospatial intelligence standards, and we are committed to developing a comprehensive, enterprise-wide standards management policy, together with a suite of standards that enable interoperability across the NSG.

5. NCGIS GOALS

The following goals represent primary focus areas for the NCGIS:

Goal 1: Interoperability

The NCGIS advances geospatial intelligence interoperability.

The ability to achieve multi-INT, multi-domain, and multi-platform interoperability is key to supporting the NSG community now and into the future. The NCGIS must work to provide interoperability both within NGA and externally to the broad NSG community.

The NCGIS will meet interoperability challenges by adopting, profiling, and validating standards and preparing procedures that enable the provision, exchange, and exploitation of geospatial intelligence within a net-centric, data-centric, and multi-INT environment. As interoperability requirements for geospatial intelligence among the Services, national partners, and within coalitions continue to evolve, the NCGIS will define levels of interoperability and build performance indicators to measure how and when interoperability is achieved.

Goal 2: Strategic Future

The NCGIS advocates geospatial intelligence standards relevant to future NSG environments.

The NCGIS must advance standards critical to enabling new sensors, new technologies, and new business processes. The NCGIS will identify, mature, and adopt new standards required to meet the

geospatial intelligence needs of the future. The NCGIS will support and enable future development of a standards-based enterprise-wide architecture.

Goal 3: Key Relationships

The NCGIS fosters key relationships and innovative partnerships to coordinate, adopt, and sustain geospatial intelligence standards.

The NCGIS plays a leadership role in supporting the Director of NGA as Functional Manager for geospatial intelligence standards and promoting the goals of the Defense Standardization Program. To carry out its responsibilities, it is critical for the NCGIS to identify, develop, and maintain strong relationships with key partners in the NSG community for the coordination, vetting, and adoption of standards relevant to geospatial intelligence. By forging partnerships with internal NGA components, other U.S. Government organizations, commercial industry, and critical national and international standards development forums, the NCGIS will leverage its program activities and gain the support that is necessary to meet its goals.

6. NCGIS OBJECTIVES

In support of each NCGIS goal, a series of objectives has been developed to focus NCGIS activities and provide a link to the specific program of work associated with each goal. Each objective will be accomplished by undertaking a series of major activities, which are summarized under each goal.

The following objectives and associated activities have been established for each goal:

GOAL 1. The NCGIS advances geospatial intelligence interoperability.

OBJECTIVE 1A: Identify and adopt geospatial intelligence standards and standards management policies to enable the Common Operational Picture (COP).

The NCGIS implements the processes and policies, and carries out the necessary activities to identify geospatial data standards that enable access and use of timely, accurate, and comprehensive geospatial intelligence data. Through formalized processes that achieve broad NSG community consensus, the NCGIS adopts and supports implementation of standards, specifications, standards profiles, and models that enable seamless sharing of geospatial intelligence and provide geospatial intelligence assurance. The NCGIS inserts mature geospatial intelligence standards into the framework provided by the DoD Information Technology Standards and Profiles Registry (DISR).

OBJECTIVE 1B: Advance standards development to enable the NSG to migrate to standards-based commercial off-the-shelf (SCOTS) and data-centric environment.

The NCGIS identifies and funds selected initiatives with open consortia that are designed to encourage industry to mature and adopt open-standards based solutions that will facilitate an interoperable NSG enterprise architecture. Current and planned initiatives are assessed for their return on investment and meeting of NSG priorities. The NCGIS, through requirements and acquisition processes, enforces implementation of SCOTS solutions in future systems acquisitions.

GOAL 2. The NCGIS advocates geospatial intelligence standards relevant to future NSG environments.

OBJECTIVE 2A: Identify and address needed standards and standards management policies for new sensors and technologies.

The NCGIS fosters development of standards for new sensors and technologies that are relevant to geospatial intelligence standards, such as hyper-spectral and multi-spectral intelligence, airborne, and motion and still imagery. The NCGIS coordinates activities that identify and address these potential standards with identified subject matter experts and key internal and external organizations.

OBJECTIVE 2B: Address standards across multiple domains to enable multi-INT integration.

The NCGIS fosters multi-INT integration across multiple domains by supporting initiatives that enable the broad-based sharing of geospatial intelligence. Initiatives, such as the development of metadata profiles and Geospatial One-Stop, are supported in collaboration with NGA's NSG customers and partners. The NCGIS supports testing of standards and prototypes and their adoption and implementation across the NSG.

GOAL 3: The NCGIS fosters key relationships and innovative partnerships to coordinate, adopt, and sustain geospatial intelligence standards.

OBJECTIVE 3A: Engage in relevant standards development activities.

The NCGIS provides the leadership and support to national, international, governmental, and non-governmental standards activities that foster the development, coordination and adoption of geospatial intelligence standards. The NCGIS assesses the relevance of standards activities and the level of support required based on factors such as return on investment and whether and how they meet NGA and NSG requirements and NCGIS goals and priorities. The NCGIS leverages community resources as it participates in standards forums, such as the International Organization for Standardization (ISO) and the Open GIS Consortium (OGC).

OBJECTIVE 3B: Develop and maintain relationships with external organizations key to the advancement of the Defense Standardization Program's and the NSG strategic intent.

The NCGIS coordinates and collaborates with key organizations external to NGA to achieve its goals and objectives and implement its program plans and business practices. Through community forums, the use of liaisons, and other communication mechanisms, the NCGIS proactively promotes the role and value of its standards program and engages NSG community and other relevant organizations on important and substantive standards issues.

OBJECTIVE 3C: Interact and coordinate with key geospatial intelligence standards activities and organizations within NGA.

The NCGIS was established to provide an enterprise-wide standards management program to carry out the Director of NGA's Functional Management responsibilities to prescribe and mandate standards related to imagery, imagery intelligence, and geospatial information. To that end, the NCGIS works with all NGA organizations engaged in standards-related activities to ensure these activities are coordinated, not duplicative, and meet the standards goals and objectives of the NCGIS and the NSG. The NCGIS works with key program offices and identified subject matter experts to put in place processes and procedures to select, develop, and adopt relevant geospatial intelligence standards and

measure their return on investment. Through the acquisition and requirements processes, the NCGIS facilitates the implementation of standards and standards profiles that support NGA's enterprise-wide systems architecture.

OBJECTIVE 3D: Develop an Outreach Program that demonstrates the value of standards and supports open communications and coordination of standards activities across the NSG.

The NCGIS has an active and a coordinated Outreach Program that increases awareness of standards and NCGIS goals and activities. The Outreach Program fosters communication and customer engagement and supports professional and educational programs and activities related to standards. NCGIS outreach activities include development of a web site, creation of educational and promotional materials, interaction with customer support and outreach offices, customer site visits and interviews, and participation in professional conferences and workshops.

The National Center for Geospatial Intelligence Standards

GOALS AND OBJECTIVES

Goal 1: The NCGIS advances geospatial intelligence interoperability.

Objective 1A: Identify and adopt geospatial intelligence standards and standards management policies to enable the Common Operational Picture (COP).

Objective 1B: Advance standards development to enable NSG migration to a standards-based commercial off-the-shelf (SCOTS) and data-centric environment.

Goal 2: The NCGIS advocates geospatial intelligence standards relevant to future NSG environments.

Objective 2A: Identify and address needed standards and standards management policies for new sensors and technologies.

Objective 2B: Address standards across multiple domains to enable multi-intelligence (multi-INT) integration.

Goal 3: The NCGIS fosters key relationships and innovative partnerships to coordinate, adopt, and sustain geospatial intelligence standards.

Objective 3A: Engage in relevant standards development activities.

Objective 3B: Develop and maintain relationships with external organizations key to the advancement of the Defense Standardization Program's and NGA's strategic intent.

Objective 3C: Interact and coordinate with key geospatial intelligence standards activities and organizations within NGA.

Objective 3D: Develop an Outreach Program that demonstrates the value of standards and supports open communications and coordination of standards activities across the NSG.

7. LINKAGE TO THE NSG STRATEGIC INTENT

The activities conducted by the NCGIS will directly support the program goals of NGA and the strategic direction outlined in the National System for Geospatial-Intelligence (NSG) Statement of Strategic Intent, The Functional Manager's Perspective, April 2004. Figure 1 contains a crosswalk between the NCGIS goals and the nine strategic goals defined in the Strategic Intent.

NCGIS Goals / NSG Strategic Intent	**NCGIS Goal 1** The NCGIS advances geospatial intelligence interoperability	**NCGIS Goal 2** The NCGIS advocates geospatial intelligence standards relevant to the future NSG environments	**NCGIS Goal 3** The NCGIS fosters key relationships and innovative partnerships to coordinate, adopt, and sustain geospatial intelligence standards
Strategic Intent Goal 1 Respond to analysis/ producton demands in perpetual crisis state	●		
Strategic Intent Goal 2 Champion and complete major investments	●		
Strategic Intent Goal 3 Forge the future environment		●	
Strategic Intent Goal 4 Align human development resources with the strategic intent			●
Strategic Intent Goal 5 Transform NGA business practices		●	
Strategic Intent Goal 6 Capitalize on all traditional and non-traditional sources		●	
Strategic Intent Goal 7 Champion multi-INT collaboration	●	●	
Strategic Intent Goal 8 Rely on partners to execute mission and achieve our vision	●		●
Strategic Intent Goal 9 Transform our infrastructure			●

Figure 1. Crosswalk of the NCGIS and NSG Strategic Intent Goals

8. CONCEPTUAL FRAMEWORK

The NCGIS has developed a conceptual framework that defines the decision-making approach that will be used to carry out NCGIS goals and objectives, and achieve the objective of a standards-based enterprise. It describes in holistic terms the mechanisms by which standards activities can be translated into the NOW, NEXT & AFTER-NEXT timeframes, reflecting the strategic transformation goals of NGA and the broader geospatial intelligence community.

Figure 2 depicts this conceptual framework and shows the three phases in the development and implementation of standards: NOW, NEXT, and AFTER-NEXT. Each phase contains three major elements: Business Processes, Standards Assessment, and Implementation. These elements represent both a top-down and bottom-up approach to decision-making, performed in the context of current policies and directions in technology and standards development.

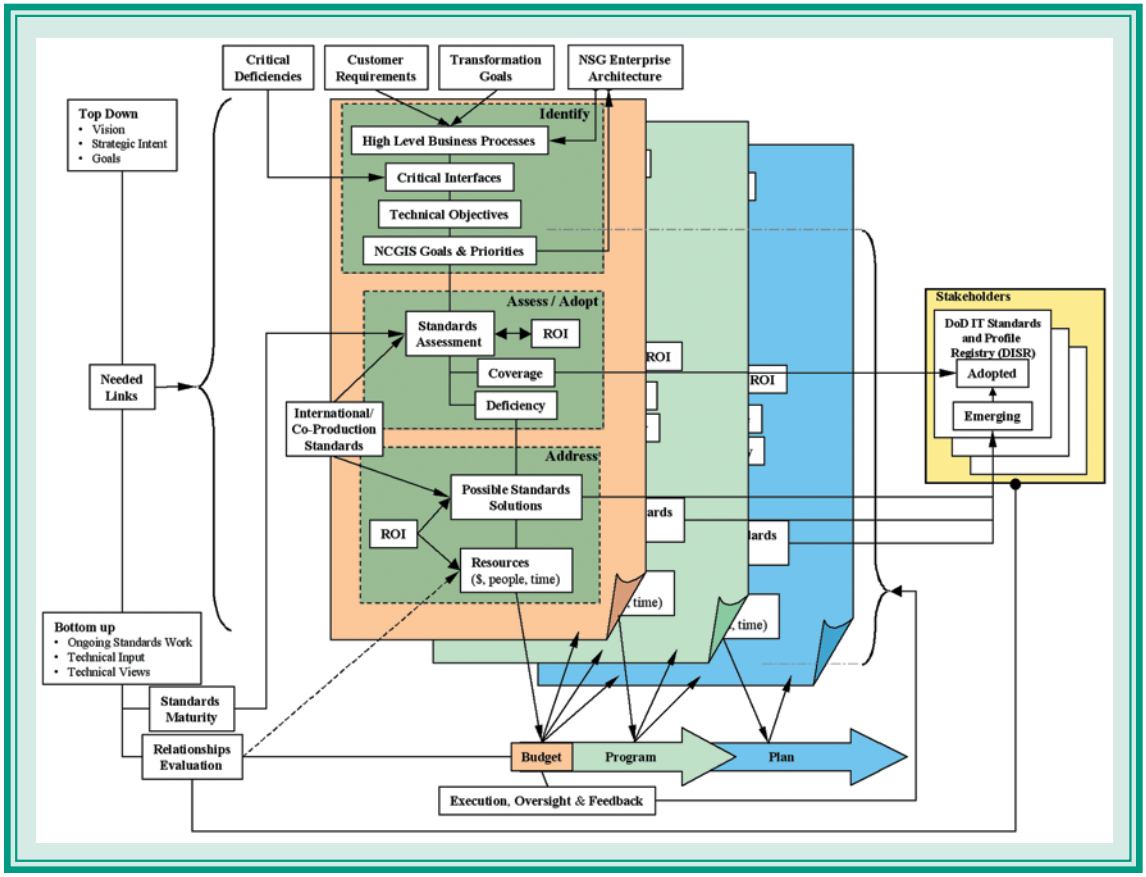


Figure 2: Conceptual framework for a decision-making process.

9. REFERENCES

1. Press Release from the Public Affairs Office, National Imagery and Mapping Agency, 18 September 2002
2. Joint Vision 2020, America's Military: Planning for Tomorrow
3. Defense Standardization Program Strategic Plan, Oct. 1999; Goal 1 of this plan states that " The DSP will advance interoperability through commonality of systems, components and architectures, and it will provide a source of information and guidance to the operational, acquisition, and logistics communities regarding commonality."
4. National System for Geospatial-Intelligence (NSG) Statement of Strategic Intent, The Functional Manager's Perspective, April 2004
5. OMB Circular A-119 directs federal agencies to use voluntary consensus standards and provides guidance for participating in voluntary consensus standards bodies.